

Complications of X-Irradiation Therapy of Pelvic Malignancy

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The resurgence of the use of x-radiation therapy in combination with surgery for regional cancer is being evaluated again. We passed through quite a similar era approximately 20 years ago. I am sure the older members of this Society remember that period quite well. A review of the literature of those results, the introduction of supervoltage therapy, and the practice of more radical surgery at present reveals that we are committing many errors of the past, and yet I believe there will be some encouraging results. The most common error is the use of large treatment ports and the administration of too great a dosage. This is probably a reasonable pitfall, since supervoltage therapy does not produce the skin changes associated with lower voltage therapy. However, the progressive changes in the deeper normal structures are still with us, and I hope these can be pointed out before this combined attack on cancer is discredited again.

Treatment of Lymph-Node Metastases

It should be emphasized that the treatment of lymph node metastases by x-radiation alone was quite unsatisfactory. This was particular obvious in the groins, axillae, and the neck. These node-bearing areas are superficial in the body, and the complications from the treatment were as serious as the cancer. The advent of antibiotics and scrupulous hygienic care to the heavily irradiated areas did reduce some of the necrosis and hemorrhage, but

this, too, was obviously not the answer. My associates and I have pursued this problem vigorously, and I wish to show you what has been accomplished by the use of multiple ports and comparatively small tumor doses, particularly in those patients having lymph node metastases from rectal cancer.

We do not know specifically what the action of x-ray really is, especially to the associated lymphatics and lymph nodes. Possibly the most simple statement is that there is some effect on the patency of the regional lymphatics and lymph nodes. Possibly the most simple statement is that there is some effect on the patency of the regional lymphatics and enough alteration of the tumor-cell structure to impair its ability to grow as a metastasis, even if dislodged by the surgical procedure.

Intestinal Lesions Caused by Radiotherapy

The majority of intestinal lesions are seen in the rectum and ileum of patients treated for cancer of the cervix by radium and external irradiation. They are essentially ulcerative or sclerotic in nature and give rise to such complications as hemorrhage, perforation, and fistula formation. Damaged bowel is thickened, indurated, and narrowed, and the serous coat is opaque and telangiectatic. The mucosa is fixed, has the appearance of skin, and bleeds with the slightest trauma. Intestinal loops are matted together, often fixed in the pelvis with the mesentery and mesocolon indurated

and shortened. There may be diminished absorptive ability and weight loss. There is also impaired peristaltic action. Lysis of adhesions or resection with anastomosis frequently results in fistula formation. Attempt at closure of these fistulae can be most discouraging to the surgeon and debilitating and eventually lethal to the patient.

There is marked variation in the radiosensitivity of the intestinal tract in different persons. In general, however, it seems that the safe maximum dose to the small intestine and colon lies in the region of 3,200 to 5,500 R in an initial course of therapy. Cancer of the lower gastrointestinal tract arising at the site of previous irradiation is very infrequent, but does occur.

Bladder Reactions to Radiotherapy

Early and late reactions in the urinary bladder following radiotherapy for pelvic malignant disease, including tumors of the bladder itself, are well known. The bladder tolerates doses up to 5,000 to 6,000 R quite well. The only point I wish to make here is that late necrosis in this organ may be readily mistaken for residual cancer. It is most important to recognize the true nature of this lesion; otherwise, further therapeutic measures may be undertaken such as additional irradiation or total cystectomy. The former may prove disastrous and the latter quite unnecessary. In making the diagnosis one must consider the previous history, the presence of radiation

changes in the skin, vagina, and rectum, and the appearances in the bladder itself. Bimanual examination may reveal a midline thickening or mass without much lateral extension. With supervoltage therapy we are seeing much more ureteral fibrosis and stenosis even to upper ureteral dilatation and hydro-nephrosis. Here, too, a differential diagnosis of residual cancer is most difficult.

Incidentally, a recent report has appeared showing stenosis of the distal aorta and the renal vessels in two young people with associated hypertension, etc., after having successful x-radiation therapy for a Wilm's tumor.

Damage to the lumbar spine, pelvis, especially the femoral neck, are well documented, but may cause sarcomatous disease and pathological fractures.

Summary

In conclusion, a variety of sequelae that may follow x-radiation therapy of the lower abdomen and pelvis have been described. With the increasing use of supervoltage therapy and treatment with higher dosages, we can expect to see an increase in the number of injuries to internal organs. Surgical intervention after vigorous radiotherapy will be accompanied by more, and serious, complications.

Careful planning of radiotherapy and regular observation during treatment by both the therapist and surgeon will do much to keep the clinician alert to the symptoms of overdosage.